

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

TITLE V No. V-01-023

SGL CARBON

HICKMAN KY.

MARCH 22, 2002

KENNETH LIBERTY, REVIEWER

PLANT I.D. # 21-075-00001

APPLICATION LOG # 53865

SOURCE DESCRIPTION:

SGL Carbon manufactures graphite electrodes mainly used for secondary metal production plants. This source is subject to Title V operating permit requirements since at least one criteria pollutant has the potential to emit emissions exceeding the major source threshold. The Title V permit application, log number 53865, was received on June 6, 2001.

Milled coke is combined with an asphalt tar which is heated, mixed and extruded through a die-mold. The hot electrode is then quenched in a water bath. Most of these electrodes are shipped out as is.

A small portion of these (green) electrodes are further treated by heating in a natural gas-fired furnace. Green electrodes are placed into furnace wells which are then filled with inert materials (rocks, etc.) before firing the gas jets. Exhaust gases from the furnace are pulled through electrostatic precipitators. After cooling, the baked electrodes are shipped as finished product. Previous construction and operating permits have limited the green electrode process rate to 2.98 tons per hour which is not physically achievable.

COMMENTS:

a. Types of Control and Efficiency

1. Two electrostatic precipitators (ESP) were custom made in 1980 by Wheelabrator-Frye to achieve a 97.33% removal of particulates at 35,300 scfm flow rate and 130°F. The single stage collection area is 4340 square feet with a 40 kVolt electrical potential. Gas from the furnace is exhausted through the ESPs in series at a flow rate of 11,000 cfm then exhausted through a stack that is 89 feet high and 4.5 feet diameter (exit velocity is 11.5 feet per second). Since only a 65% removal efficiency is required to meet the allowable pursuant to 401 KAR 5:010, New Process Operations, one ESP can be taken off-line for cleaning without exceeding the allowable. The ESPs are controlled through monitoring and recordkeeping to maintain removal efficiency. The permittee is required to perform stack tests on the Ring Bake furnace for particulate matter for compliance.

2. Particulate emissions from the Eirich mixer, coke grinding and Hargraf machine (baked electrode finishing) are controlled by separate baghouses which have a control efficiency of 99%.

b. Emission Factors and Their Source

The emission factors were determined from the AP-42 manual, material balances and engineering calculations. The permittee is required to perform a separate stack test from the Ring Bake Furnace to comply with the particulate emissions limit.

c. Applicable Regulations, including State Origin regulations

The following regulations apply to this facility:

1. 401 KAR 59:010, New Process Operations. This covers the grinders, conveying equipment, furnaces and coke grinding processes.
2. 401 KAR 59:015, New Indirect Heat Exchangers.
3. 401 KAR 61:015, Existing Indirect Heat Exchangers.
3. 401 KAR 63:020, Potentially Hazardous Matter or Toxic Substances. The coal tar pitch contains the hazardous air pollutants dibenzofuran and polyaromatic hydrocarbons (PAHs) at concentrations of 0.02 % and 2.9% by weight, respectively.
4. 401 KAR 60:005: 40 CFR 60 Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984. Heated tanks are used to contain coal tar pitch.

d. Regulations not Applicable :

1. 401 KAR 52:090, Prohibitory Rule for Hot Mix Asphalt Plants
2. 401 KAR 59:046, Selected New Petroleum Refining Processes and Equipment
3. 401 KAR 63:025, Asphalt Paving Operations

e. Unusual Circumstance with the Ring Bake Furnace Emissions

In previous permits, the operating limit for green (unbaked) anode throughput was 2.98 tons per hour (71.5 tons per day). After discussion with SGL Carbon, the Ring Bake Furnace was physically capable of processing only 53 tons per day until a recent modification (Log 53864) increased throughput by 25 % to achieve 66.25 tons per day (2.76 tons per hour). Assuming that the particulate matter (PM) emissions factor remains the same, PM emissions should be less than what was previously permitted. A stack test on the Ring Bake Furnace and electrostatic precipitators outlet should confirm that PM emissions are well below the allowable. The discrepancy in green anode throughput could be a result of recent changes in operation and shutdown of certain equipment.

EMISSION AND OPERATING CAPS DESCRIPTION:

The following table summarizes the maximum operating rates, potential emissions and applicable regulations.

Group No.	Source Name	Process Unit	Stack No.	Maximum Operating Rate	PTE or Allowable (lb/hr)	Control Device	Appl. Regs.
1	Coke Unloading	1) Hopper	1	25 tons/hr	PM ¹ : 3.87	none	59:010
2	Particle Screening	1) Morgensen Screen (small fraction)	2	14 tons/hr	PM ¹ : 2.97	Wheelabrator Dust Collector (DC-30-6)	59:010
3	Tanks	1) Coal tar pitch	3	285 gal/hr	VOC: 4.6 HAP: 0.12	Plastic Technics Condenser (2)	40CFR60 Sub Kb
		2) Coal tar pitch	3	285 gal/hr	VOC: 4.6 HAP: 0.12		
4	Mixing and Extrusion	1) Eirich mixer	4	25 tons/hr	PM ¹ : 0.19 VOC: 0.19	Eisen Mann TO/ Trema Wet Scrubber	59:010
		2) Eisen Mann RTO	4	0.5 mmBtu			
5	Baking Conveyor System	1) Dump Hopper	5	20 tons/hr	PM ¹ : 2.98	none	59:010
		2) Vibrating Screens		8 tons/hr	PM ¹ : 1.2		
		3) Rotex Screener		16 tons/hr	PM ¹ : 2.4		
6	Hargraf Machine	1) Hargraf Cleaning	6	7.5 tons/hr	PM ¹ : 1.88	Pangborn Baghouse	61:020
7	Ring Bake Furnace	1) Electrode Bake	7	2.98 tons/hr	PM: 7.09	Wheelabrator ESPs ³ (2)	59:010 and 59:105
		2) Natural Gas		none	SO ₂ : 3.15 VOC: 12.9 CO: 19.7 NO ₂ : 1.6		

¹ Calculated PTE is below allowable standards.

² Emissions from the baking electrodes and natural gas firing are exhausted through the same stack. There are no specific new source performance standards or applicable regulations pertaining to natural gas usage for direct heating. ³ ESPs are run either in series or singly while one is being cleaned.

⁴ Boiler activities are insignificant but listed here for reference.

PERIODIC MONITORING:

The owner or operator shall submit a summary report to the Regional Office at least every six months during the life of the Title V permit. The submitted report can be constructed from the facilities on-line monitoring system.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.

COMMENTS:

Emission factors and rates were estimated using previous engineering calculations. Emissions factors from AP-42 were not available for all processes.

PUBLIC AND U.S. EPA REVIEW:

On April 11, 2002, the public notice on availability of the draft/proposed permit and supporting material for comments by persons affected by the plant was published in The Fulton Leader in Fulton County, Kentucky. The public comment period expired 30 days from the date of publication. During this time no comments were received from the general public.

The draft/proposed permit and supporting documentation were electronically transmitted to U.S. EPA on June 16, 2002. No comments were received from U.S. EPA during the 45 day comment period.